

## *Book Reviews*

VARIABILITY IN HUMAN FERTILITY. Edited by Lyliane Rosetta and C.G.N. Mascie-Taylor. 1996. New York: Cambridge University Press. 225 pp. ISBN 0-521-49569-5. \$54.95 (cloth).

It is generally assumed that biological variation in human reproductive functioning is relatively insignificant among postmenarcheal/premenopausal women. Biomedical models commonly view individual deviations from a clinically derived norm as pathological. Demographers usually argue that differences in fertility among populations result primarily from variations in reproductively related behavior and social practices (for example, age at marriage and contraceptive use). In contrast, biological anthropologists have sought to understand human fertility within the framework of evolutionary ecology, and thus have argued that variation in reproductive functioning is to be expected and is likely to be adaptive. In other words, biological variation is natural rather than deviant and, furthermore, makes a significant contribution to interindividual and interpopulational variation in human fertility. Thus reproductive ecology ignores neither pathological conditions nor the importance of behavior, but rather broadens our understanding of the determinants of variability in human fertility. This volume contributes to the growing body of research that supports this relatively new but very promising perspective.

The collection of articles is divided into three sections. Part I considers the hormonal aspects of fertility regulation, leading with a concise summation by Thalabard, Goubillon, and Plu-Bureau of current knowledge of the hypothalamo-pituitary-gonadal axis in mammals. Although not for the uninitiated, the extensive bibliography is an excellent resource for those wishing to delve further. Lee's analysis of fertility constraints, drawing upon the work of behavioral ecologists

studying a wide range of mammalian species as well as her own research on elephants and primates, delineates the known links between ecological and social factors and reproductive success. In evaluating the available data, her point that "captive fat primate females are probably more similar to western well-nourished women than they are to their wild counterparts" also reminds us that western women are not likely to be an appropriate "standard" for evaluating species-wide human variation in reproductive functioning. Bentley examines interpopulational variation in endogenous steroid hormones and reviews the evidence for the hypothesis that this variation may arise from differences in dietary composition that may affect the metabolic processes of endogenous steroids. Her intriguing analysis should prompt more investigations of the magnitude and causes of variation in endogenous steroids, especially because of the possibility of developing population specific hormonal contraceptives. (Note a typesetter's omission: on page 48 the salivary progesterone value for Polish women is 275 pmol/L.)

Part II, focusing on the causes of natural biological variation, opens with Ellison's investigations of the effect of age on ovarian function. Data on salivary progesterone (P) collected by collaborators in diverse populations clearly demonstrate marked changes with age, the peak occurring around 30 years (in Figure 5.5 the unusually steep slope at older ages in midluteal P levels for the Bolivian sample is an analytical artifact; all of the women in the sample reported regular cycles and were  $\leq 42$  years old). These findings are in stark contradiction to the assumption that ovarian function in postmenarcheal/premenopausal women is relatively constant. Ellison also provides a brief review of his hypothesis regarding developmental effects on adult ovarian function, noting that an alternative developmental hypothesis that I first proposed in 1989 claims that chronic energy deficiency does

not affect female fecundity. Rather, I have argued that intra- and interpopulational differences in response to a given energy deficit may be explained by variation in ontogenetic histories (Vitzthum, 1997).

Rosetta gives an overview of the likely sources of nonpathological variability in fertility (i.e. fecundity), arguing that although nutrition and physical activity can exert some influence, in both men and women age is the most important origin of intraindividual variability while individual genetic factors are primarily responsible for interindividual variation (though perhaps less clearly so for men than women). The existence of interpopulational variability in male fecundity has yet to be demonstrated. While there is evidence of populational differences in female fecundity, the causes remain uncertain (perhaps dietary, perhaps genetic), and the patterns unclear. Disallowing pathological causes, Rosetta suggests that hunter-gatherers would be expected to have "higher natural fertility," followed by pastoralists and poor nonmechanized farmers, and finally impoverished slum populations. Current evidence suggests otherwise. Unlike some hunter-gatherers, some pastoral populations have a ready breastmilk substitute, thus curtailing one of the most important mechanisms for suppressing fecundity. Historical records suggest high fertility in slum populations during the early industrial revolution exacerbated unprecedented levels of infanticide, and contemporary slum populations also contribute to high fertility rates in some developing countries. Analyses by Bentley et al. (1993) found that a range of fertility levels is associated with a given subsistence mode. In sum, regarding explanations for natural interpopulational variation in fecundity, generalities remain elusive. Rosetta rightly concludes that biological anthropologists have much to contribute.

Referring us to an in-depth overview by McFalls (1984), Mascie-Taylor provides a sketch of the effects of several nonsexually and sexually transmitted diseases on fecundity. The very brief section on HIV asserts that "there is no obvious differences in rates" of "transmission from male to female and

female to male." In fact, the preponderance of several years' evidence clearly indicates that females are many times more likely to be infected by a male sexual partner than vice versa (European Study Group, 1989; Farmer et al., 1996, and references therein).

Part III comprises four articles dealing with energy expenditure in humans, a subject of broader application than the volume's focus on fertility. Shetty concludes from the full range of evidence that the hypothesis of metabolic adaptation under conditions of energy deficit is not supported. He notes that for pregnant women methodological limitations preclude reaching a clear decision though, should such energy-sparing adaptations exist, they indicate a system stressed beyond its limits with potentially negative consequences for pregnancy outcome (e.g., birthweight). Rieu explores the mechanisms by which energy expenditure can be reduced. Behavioral adaptations reduce the total daily quantity of work; physiological changes increase mechanical efficiency, either (other than environmental factors) by technical improvements in performance or perhaps by a yet to be known biological adaptation. Norgan's chapter on methodological issues pertaining to the measurement of body composition is exceptionally useful, especially for those seeking to elucidate its relationship to variations in fertility. Lunn reviews the connections among breastfeeding, maternal nutritional status, and postpartum subfecundity, concluding that while both factors contribute to the outcome, albeit in ways more subtle than originally anticipated, it remains to be demonstrated that the interaction of lactation and nutrition are important in terms of lifetime fertility and population growth.

Overall, the volume is a quick read, providing many interesting insights. A more involved editorial hand would have been appreciated. In some contributions, assertions without citations are very frustrating, and the frequent and seemingly cavalier substitution of "fertility" (the production of a live birth) for "fecundity" (the capacity to conceive) and vice versa (e.g., page 119: pregnancy loss lowers fertility, *not* fecundity) is,

at best, confusing. Although not intended for students or the casual reader, the volume should prove interesting to those familiar with current debates in reproductive ecology.

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